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Exercise-I (Conceptual Questions) Build Up Your Understanding

Alcohol

1. The compound A, B and C in the reaction sequence

$CH_3CH_2OH \xrightarrow{PBr_3} A \xrightarrow[\Delta]{alc.KOH} B \xrightarrow{Br_2} C$ are given by the set

(1) C_2H_5Br, CH_3CH_2OH, CH_3CHBr_2

(2) C_2H_5Br, $CH{\equiv}CH$, $CH_2{=}CHBr$

(3) C_2H_5Br, $CH_2{=}CH_2$, $CH_2Br{-}CH_2Br$

(4) C_2H_5Br, CH_3CH_2OH, $BrCH_2{-}CH_2Br$

2. Which of the following alcohols gives a red colour in Victor Meyer test

(1) $CH_3{-}CH_2{-}CH_2{-}OH$

(2) $CH_3{-}\underset{\displaystyle CH_3}{\underset{|}{CH}}{-}OH$

(3) $(CH_3)_3C{-}OH$

(4) $CH_3{-}\underset{\displaystyle OH}{\underset{|}{CH}}{-}CH_2{-}CH_3$

3. Which of the following does not turn orange colour of chromic acid to green

(1) 1° alcohol (2) 2° alcohol

(3) 3° alcohol (4) Allyl alcohol

4. p, s and t-alcohols can be distinguished by :-

(1) Reimer-Tieman reaction

(2) Tollen's reagent

(3) Lucas test

(4) Lassaigne's test

5. Consider the following reaction :

$C_2H_5OH + H_2SO_4 \rightarrow$ Product

Among the following, which one cannot be formed as a product under any conditions ?

(1) $C_2H_5OSO_3H$

(2) $H_2C{=}CH_2$

(3) $HC{\equiv}CH$

(4) $CH_3{-}CH_2{-}O{-}CH_2{-}CH_3$

6. Select the incorrect option for the following reaction:

$CH_3{-}CH = CH_2 + H_2O \xrightarrow{H^+} CH_3{-}\underset{\displaystyle OH}{\underset{|}{CH}}{-}CH_3$

(1) This is an example of NAR of alkene

(2) In the first step, protonation of alkene takes place on carbocation

(3) In the second step, Nucleophilic attack of water takes place on carbocation

(4) In the last step deprotonation takes place to form an alcohol

7. For the reduction of aldehydes and ketones into alcohol the reagent which can be used is/are :

(1) H_2 in presence of Ni, Pt or Pd

(2) $NaBH_4$

(3) $LiAlH_4$

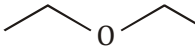
(4) All of these

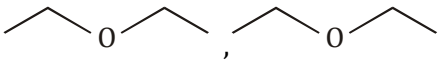
8. Which of the following does not reduces the carboxylic acids into alcohol ?

(1) $\xrightarrow[2.H_3O^+]{1.LiAlH_4/ether}$ (2) $\xrightarrow[2.H_3O^+]{1.B_2H_6}$

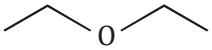
(3) $NaBH_4$ (4) $\xrightarrow[H^+]{ROH} \xrightarrow[Catalyst]{H_2}$

9. $CH_3CH_2OH \xrightarrow[443K]{H_2SO_4} A$, $\xrightarrow[413K]{H_2SO_4} B$ A and B are (respectively)

(1)  , $CH_2 = CH_2$

(2) 

(3) $CH_2 = CH_2$, $CH_2 = CH_2$

(4) $CH_2 = CH_2$, 

10. Which of the following is insoluble in water ?

(1) Ethanol (2) Ethoxyethane

(3) Phenol (4) Pentane

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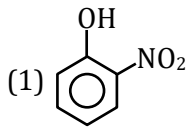
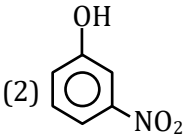
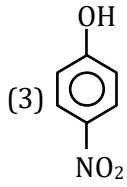
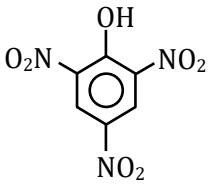
Phenol

11. Nitration of phenol with conc. H_2SO_4 followed by nitric acid gives :-

(1) 

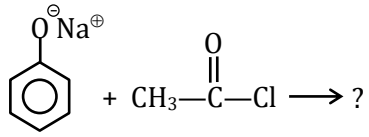
(2) 

(3) 

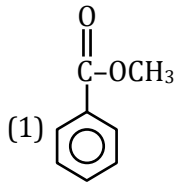
(4) 

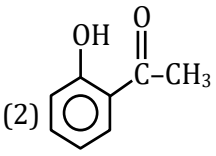
12. Deoxygenation of phenol can be achieved by distillation with :-
(1) Raney nickel
(2) Lithium aluminium hydride
(3) Sodium borohydride
(4) Zinc dust

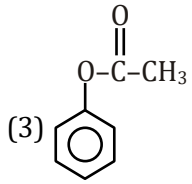
13. Which of the following compounds shows intramolecular hydrogen bonding :-
(1) p–Nitrophenol (2) Ethanol
(3) o–Nitrophenol (4) Methanamine

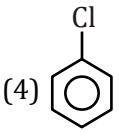
14. 

Sodium phenate

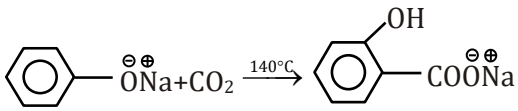
(1) 

(2) 

(3) 

(4) 

15. The reaction



is called :-
(1) Schotten Bauman reaction
(2) Kolbe Schmidt reaction
(3) Reimer–Tiemann reaction
(4) Lederer–Manasse reaction

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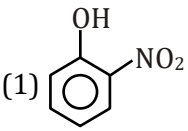
16. Phenol can be distinguished from ethanol by reactions with the following except :-
(1) Iodine and alkali (2) Ferric chloride
(3) Acetyl chloride (4) Bromine water

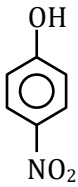
17. Phenol on treatment with methyl chloride in the presence of anhydrous $AlCl_3$ gives chiefly:-
(1) o–cresol (2) m–cresol
(3) Anisole (4) p–cresol

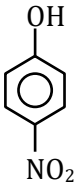
18. Phenol on heating with $NaNO_2$ and a few drops of conc. H_2SO_4 mainly gives :-
(1) p–nitrophenol (2) p–nitrosophenol
(3) o–nitrophenol (4) m–nitrosophenol

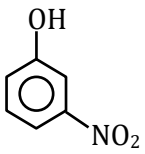
19. Phenol and benzoic acid are distinguished by:-
(1) Lucas reagent
(2) Victor Meyer test
(3) Caustic soda
(4) Sodium bicarbonate

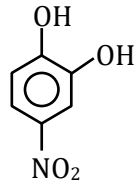
20. Phenol on treatment with dil HNO_3 at low temp (298 K) gives two products P and Q. P is steam volatile but Q is not. P and Q are respectively.

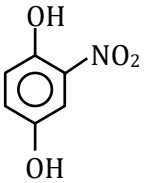
(1) 

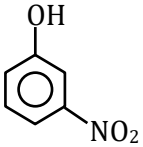
and 

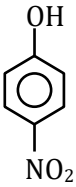
(2) 

and 

(3) 

and 

(4) 

and 

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Ether

21. The preparation of ethers from alcohols by using sulphuric acid is called :-
(1) Williamson's ether Synthesis
(2) Williamson's continuous etherification process
(3) Ziesel's method
(4) Zerewitinoff method

22. $CH_3-\underset{\underset{OH}{|}}{CH}-CH_3 \xrightarrow{PBr_3} X \xrightarrow{Mg/ether} Y \xrightarrow{H_2O/H^+}$

The final product is :-
(1) $CH_3-\underset{\underset{CH_3}{|}}{CH}-OH$
(2) $CH_3-CH_2-CH_2-OH$
(3) $CH_3-\underset{\underset{CH_3}{|}}{CH}-O-\underset{\underset{CH_3}{|}}{CH}-CH_3$
(4) $CH_3-CH_2-CH_3$

23. In the reaction sequence
$A \xrightarrow{HBr} B \xrightarrow{C_2H_5ONa}$ Ethoxyethane,
A and B are :-
(1) C_2H_6, C_2H_5Br (2) CH_4, CH_3Br
(3) $CH_2=CH_2$, C_2H_5Br (4) $CH\equiv CH$, $CH_2=CHBr$

24. $CH_3-CH_2-OH + Ph-CH_2-OH \xrightarrow[140^\circ C]{H^\oplus}$ of which is not obtained?
(1) $CH_3-CH_2-OCH_2-CH_3$
(2) $Ph-CH_2-OCH_2-Ph$
(3) $Ph-CH_2-O-CH_2-CH_3$
(4) $Ph-CH_2-O-CH_2-O-CH_3$

25. Oxonium ion of ether has the structure :-
(1) $C_2H_5-O-\underset{\underset{CH_3}{|}}{CH}-\overset{\oplus}{\underset{\underset{H}{|}}{O}}-H$
(2) $CH_3-CH_2-\overset{\oplus}{\underset{\underset{H}{|}}{O}}-CH_2-CH_3$
(3) $(C_2H_5)_2O$
(4) $CH_3-CH_2-O-CH_2-CH_2-CH_2-\overset{\oplus}{\underset{\underset{H}{|}}{O}}-O-H$

26. Which of the following does not react with aq. NaOH :-
(1) Phenol (2) Benzoic acid
(3) CH_3COOH (4) $CH_3-O-C_6H_5$

27. A student tried two reactions for preparing tert-butyl ethyl ether :

(I) $C_2H_5ONa + CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-Cl \longrightarrow$

(II) $CH_3-\underset{\underset{CH_3}{|}}{\overset{\overset{CH_3}{|}}{C}}-ONa + CH_3-CH_2-Cl \longrightarrow$

Which reaction will give better yield of tert. butyl ethyl ether ?
(1) Only I (2) Only II
(3) Both I & II (4) Neither I nor II

EXERCISE-I (Conceptual Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	3	1	3	3	3	1	4	3	4	4	4	4	3	3	2
Question	16	17	18	19	20	21	22	23	24	25	26	27			
Answer	3	4	2	4	1	2	4	3	4	2	4	2			

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Exercise-II (Previous Year Questions) AIPMT/NEET

AIPMT 2006

1. The major organic products of reaction are $CH_3–O–CH(CH_3)_2 + HI \longrightarrow$

(1) $CH_3OH + (CH_3)_2CHI$ (2) $ICH_2–O–CH(CH_3)_2$

(3) $CH_3–O–\underset{\underset{I}{|}}{C}(CH_3)_2$ (4) $CH_3I + (CH_3)_2CHOH$

AIPMT 2007

2. In the reaction :

$$CH_3–\underset{\underset{CH_3}{|}}{CH}–CH_2–O–CH_2–CH_3 + HI \longrightarrow .....$$

which of following compounds will be formed :

(1) $CH_3–\underset{\underset{CH_3}{|}}{CH}–CH_3 + CH_3–CH_2–OH$

(2) $CH_3–\underset{\underset{CH_3}{|}}{CH}–CH_2–OH + CH_3–CH_3$

(3) $CH_3–\underset{\underset{CH_3}{|}}{CH}–CH_2–OH + CH_3–CH_2–I$

(4) $CH_3–\underset{\underset{CH_3}{|}}{CH}–CH_2–I + CH_3–CH_2–OH$

AIPMT 2009

3. $H_2COH.CH_2OH$ on heating with periodic acid gives :-

(1) $2\begin{matrix}H\\H\end{matrix}\!\!>\!C=O$ (2) $2CO_2$

(3) 2HCOOH (4) $\begin{matrix}CHO\\|\\CHO\end{matrix}$

4. Consider the following reaction,

ethanol $\xrightarrow{PBr_3}$ X $\xrightarrow{\text{alc. KOH}}$ Y $\xrightarrow[(ii)\,H_2O]{(i)\,H_2SO_4\ \text{room temperature}}$ Z ;

the product Z is :-

(1) CH_3CH_2OH

(2) $CH_2 = CH_2$

(3) $CH_3CH_2 – O – CH_2 – CH_3$

(4) $CH_3 – CH_2 – O – SO_3H$

5. Consider the following reaction :

$$\text{Phenol} \xrightarrow[\Delta]{\text{Zn dust}} X \xrightarrow[\text{Anhydrous } AlCl_3]{CH_3Cl} Y \xrightarrow[\Delta]{KMnO_4} Z$$

the product Z is :-

(1) Benzene (2) Toluene

(3) Benzaldehyde (4) Benzoic acid

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AIPMT 2010

6. When glycerol is treated with excess of HI, it produces :-

(1) Allyl iodide (2) Propene

(3) Glyceryl triiodide (4) 2-iodopropane

AIPMT Pre. 2011

7. In the following reactions,

(a) $CH_3–\underset{\underset{OH}{|}}{CH}–CH–CH_3 \xrightarrow{H^+/Heat} \underset{\text{Major product}}{A} + \underset{\text{Minor product}}{B}$

(b) $A \xrightarrow[\text{in absence of peroxide}]{HBr,\ dark} \underset{\text{Major product}}{C} + \underset{\text{Minor product}}{D}$

the major products (A) and (C) are respectively :-

(1) $CH_2=\underset{\underset{CH_3}{|}}{C}–CH_2–CH_3$ and $CH_2–\underset{\underset{Br}{|}}{CH}–CH_2–CH_3$

(2) $CH_3–\underset{\underset{CH_3}{|}}{C}=CH–CH_3$ and $CH_3–\underset{\underset{Br}{|}}{\underset{\underset{CH_3}{|}}{C}}–CH_2–CH_3$

(3) $CH_3–\underset{\underset{CH_3}{|}}{C}=CH–CH_3$ and $CH_3–\underset{\underset{Br}{|}}{\underset{\underset{CH_3}{|}}{CH}}–CH_2–CH_3$

(4) $CH_2=\underset{\underset{CH_3}{|}}{C}–CH_2–CH_3$ and $CH_3–\underset{\underset{Br}{|}}{\underset{\underset{CH_3}{|}}{C}}–CH_2–CH_3$

AIPMT Mains 2011

8. Consider the reaction :

(i) $(CH_3)_2CH–CH_2Br \xrightarrow{C_2H_5OH} (CH_3)_2CH–CH_2OC_2H_5 + HBr$

(ii) $(CH_3)_2CH–CH_2Br \xrightarrow{C_2H_5O^-} (CH_3)_2CH–CH_2OC_2H_5 + Br^-$

The mechanisms of reaction (i) and (ii) are respectively :-

(1) S_{N^2} and S_{N^1} (2) S_{N^1} and S_{N^2}

(3) S_{N^1} and S_{N^1} (4) S_{N^2} and S_{N^2}

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NEET UG 2013

9. Among the following ethers, which one will produce methyl alcohol on treatment with hot concentrated HI ?

(1) $CH_3-\underset{\displaystyle CH_3}{\underset{|}{CH}}-CH_2-O-CH_3$

(2) $CH_3-CH_2-CH_2-CH_2-O-CH_3$

(3) $CH_3-CH_2-\underset{\displaystyle CH_3}{\underset{|}{CH}}-O-CH_3$

(4) $CH_3-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\overset{|}{\underset{|}{C}}}}-O-CH_3$

AIPMT 2014

10. Among the following sets of reactants which one produces anisole?

(1) CH_3CHO ; RMgX

(2) C_6H_5OH ; NaOH ; CH_3I

(3) C_6H_5OH ; neutral $FeCl_3$

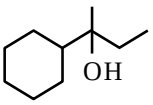
(4) $C_6H_5 - CH_3$; CH_3COCl; $AlCl_3$

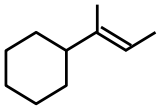
RE-AIPMT 2015

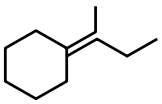
11. Reaction of phenol with chloroform in presence of dilute sodium hydroxide finally introduces which one of the following functional group ?

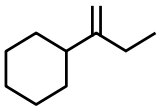
(1) $-CHCl_2$ (2) $-CHO$

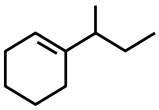
(3) $-CH_2Cl$ (4) $-COOH$

12. Which of the following is not the product of dehydration of  ?

(1) 

(2) 

(3) 

(4) 

NEET(UG) 2017

13. The heating of phenyl–methyl ethers with HI produces

(1) Iodobenzene

(2) Phenol

(3) Benzene

(4) Ethyl chlorides

NEET(UG) 2018

14. The compound A on treatment with Na gives B, and with PCl_5 gives C. B and C react together to give diethyl ether. A, B and C are in the order

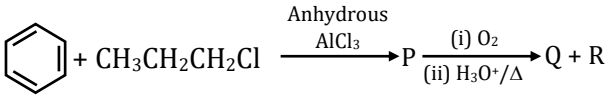
(1) C_2H_5OH, C_2H_6, C_2H_5Cl

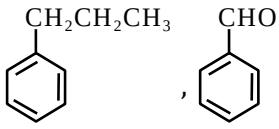
(2) C_2H_5OH, C_2H_5Cl, C_2H_5ONa

(3) C_2H_5Cl, C_2H_6, C_2H_5OH

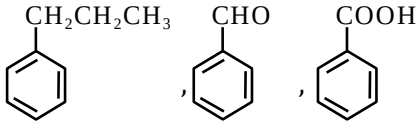
(4) C_2H_5OH, C_2H_5ONa, C_2H_5Cl

15. Identify the major products P, Q and R in the following sequence of reaction :

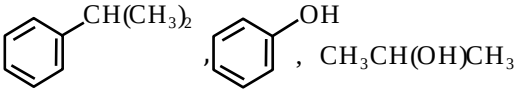


(1) 

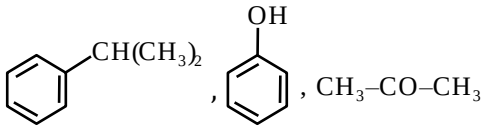
P Q R

(2) 

P Q R

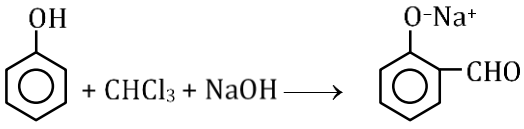
(3) 

P Q R

(4) 

P Q R

16. In the reaction



the electrophile involved is

(1) Dichloromethyl cation ($\overset{\oplus}{C}HCl_2$)

(2) Formyl cation ($\overset{\oplus}{C}HO$)

(3) Dichloromethyl anion ($\overset{\ominus}{C}HCl_2$)

(4) Dichlorocarbene ($:CCl_2$)

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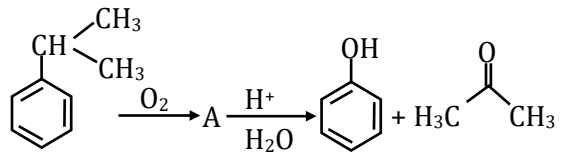
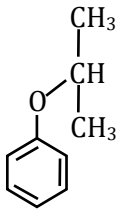
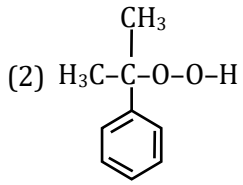
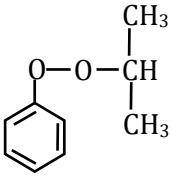
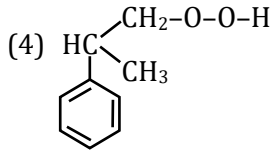
17. The structure of intermediate A in the following reaction is :-



(1) 

(2) 

(3) 

(4) 

NEET(UG) 2019 (ODISHA)

18. The major products C and D formed in the following reactions respectively are :-

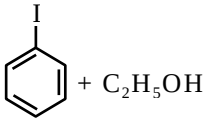
$H_3C-CH_2-CH_2-O-C(CH_3)_3 \xrightarrow[\Delta]{\text{excess HI}} C + D$

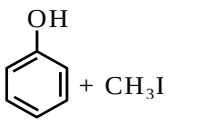
(1) $H_3C-CH_2-CH_2-I$ and $I-C(CH_3)_3$
(2) $H_3C-CH_2-CH_2-OH$ and $I-C(CH_3)_3$
(3) $H_3C-CH_2-CH_2-I$ and $HO-C(CH_3)_3$
(4) $H_3C-CH_2-CH_2-OH$ and $HO-C(CH_3)_3$

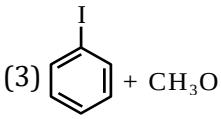
NEET(UG) 2020

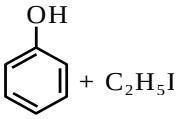
19. Reaction between acetone and methylmagnesium chloride followed by hydrolysis will give :
(1) Isobutyl alcohol (2) Isopropyl alcohol
(3) Sec. butyl alcohol (4) Tert. butyl alcohol

20. Anisole on cleavage with HI gives:

(1) 

(2) 

(3) 

(4) 

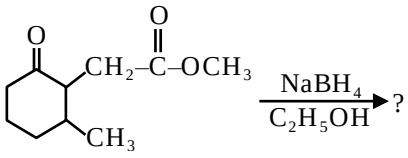
NEET(UG) 2021

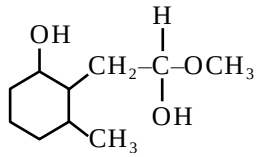
21. What is the IUPAC name of the organic compound formed in the following chemical reaction ?

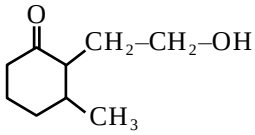
Acetone $\xrightarrow[(ii)\ H_2O,\ H^+]{(i)\ C_2H_5MgBr,\ \text{dry Ether}}$ Product

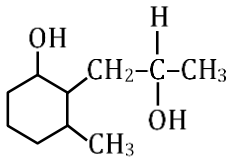
(1) 2-methyl propan-2-ol
(2) pentan-2-ol
(3) pentan-3-ol
(4) 2-methyl butan-2-ol

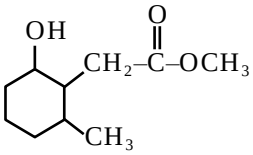
22. The product formed in the following chemical reaction is



(1) 

(2) 

(3) 

(4) 

EXERCISE-II (Previous Year Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	4	3	1	1	4	4	2	4	4	2	2	4	2	4	4
Question	16	17	18	19	20	21	22								
Answer	4	2	1	4	2	4	4								

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Exercise-III (Analytical Questions) Master Your Understanding

1. Methanol can be distinguished from ethanol by the following except

(1) Reaction with iodine and alkali

(2) Reaction with salicylic acid and H_2SO_4

(3) Reaction with Lucas reagent

(4) Boiling point

2. Ethanol on heating with acetic acid in the presence of a few drops of sulphuric acid gives the smell of

(1) Oil of wintergreen

(2) Oil of mustard

(3) An ester

(4) Oil of bitter almonds

3. The compounds A, B and C in the reaction sequence are given by the set :-

$$CH_3CH_2OH \xrightarrow[\Delta]{HBr} A \xrightarrow{Mg} B \xrightarrow[(ii)H_3O^{\oplus}]{(i)CH_3CHO} C$$

(1) CH_3CH_2Br, CH_3CH_2MgBr, $(CH_3)_3C—OH$

(2) CH_3CH_2Br, $(CH_3CH_2)_2Mg$, $(CH_3)_2CHCH_2OH$

(3) CH_3CH_2Br,CH_3CH_2MgBr,$CH_3CH(OH)CH_2CH_3$

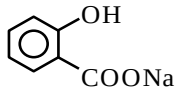
(4) CH_3CHBr_2,$CH_3CH(MgBr)_2$,$CH_3CH(OH)CH_3$

4. Which of the following reactions will not lead to a phenol :-

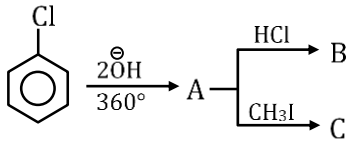
(1) $C_6H_5SO_3Na + NaOH \xrightarrow[ii)H^+]{i)\ Fuse/\Delta}$

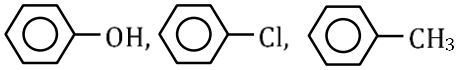
(2) $C_6H_5N_2Cl + H_2O \xrightarrow{Boil}$

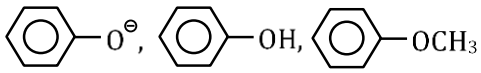
(3) $C_6H_5ONa + RX \xrightarrow[Heat]{NaOH}$

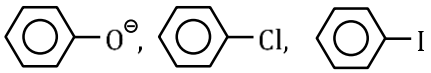
(4)  $+ NaOH(CaO) \xrightarrow{Heat}$

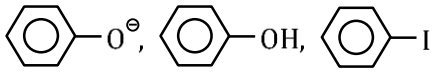
5. The structures of the compounds / ions A, B and C in the reaction sequence are given by the set :-

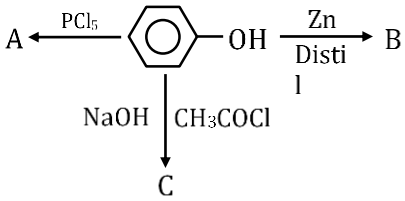


(1) 

(2) 

(3) 

(4) 

6. 

The compounds A, B and C in the above reaction sequence are :-

(1) Chlorobenzene, benzene, methyl benzoate

(2) Triphenyl phosphate, benzene, phenyl acetate

(3) Benzyl chloride, benzene, phenyl acetate

(4) Benzyl chloride, benzene, phenylacetyl chloride

7. In the reaction sequence —

$$C_6H_5SO_3Na \xrightarrow[350°C]{NaOH} A \xrightarrow{CH_3I} B \xrightarrow{HI} C + D$$

A, B, C and D are given by the set :-

(1) Sodium phenate, anisole, C_6H_5I, CH_3OH

(2) Sodium phenate, phenetole, C_2H_5I, C_6H_5OH

(3) Sodium phenate, anisole, C_6H_5OH, CH_3I

(4) Sodium phenate, phenetole, C_6H_5I, C_2H_5OH

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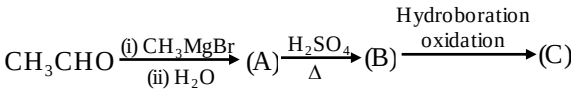
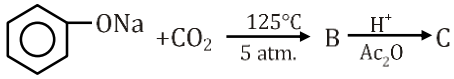
8. Compound A and C in the following reaction are

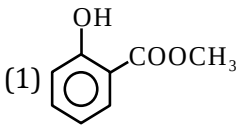


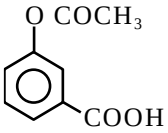
(1) Identical
(2) Functional isomer
(3) Positional isomer
(4) Optical isomer

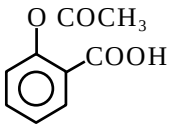
9. Sodium phenoxide when heated with CO_2 under pressure at 125°C yields a product which on acetylation produces C

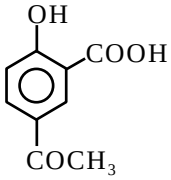


The major product C would be :

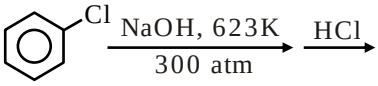
(1) 

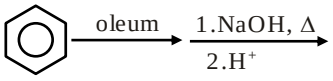
(2) 

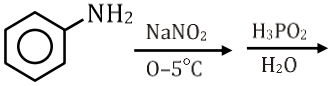
(3) 

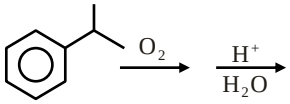
(4) 

10. Which of the following reaction sequence does not give phenol ?

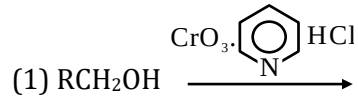
(1) 

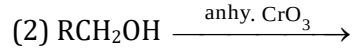
(2) 

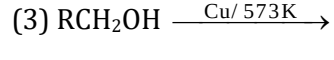
(3) 

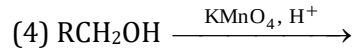
(4) 

11. Which of the following reactions does not give aldehyde as major product ?

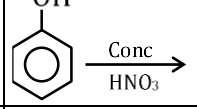
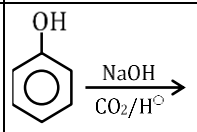
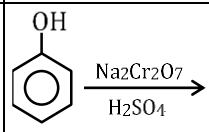
(1) 

(2) 

(3) 

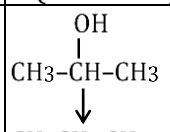
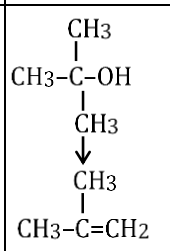
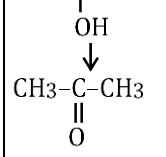
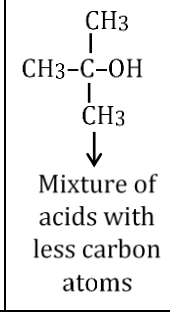
(4) 

12. Match the column

	Column-I (Reactions)		Column-II (Product)
(a)		(p)	Aspirin
(b)		(q)	Picric acid
(c)		(r)	Salicylic acid
(d)	Salicylic acid $\xrightarrow[H^+]{(CH_3CO)_2O}$	(s)	Benzoquinone

(1) a-q, b-r, c-s, d-p
(2) a-q, b-s, c-r, d-p
(3) a-s, b-r, c-p, d-q
(4) a-r, b-s, c-q, d-p

13. Match the column

	Column-I (Reactions)		Column-II (Reagents)
(a)		(p)	$KMnO_4$/ elevated temp.
(b)		(q)	85% H_3PO_4/440K
(c)		(r)	20% H_3PO_4/358K
(d)		(s)	CrO_3

(1) a-q, b-s, c-p, d-r
(2) a-q, b-r, c-s, d-p
(3) a-r, b-s, c-p, d-q
(4) a-s, b-p, c-q, d-r

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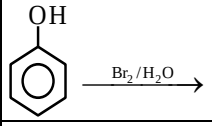
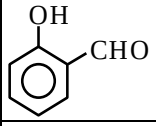
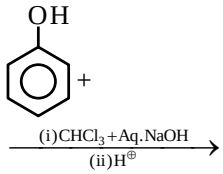
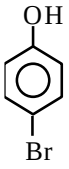
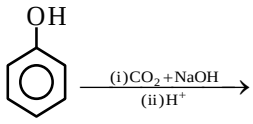
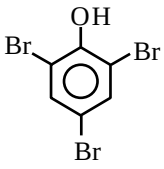
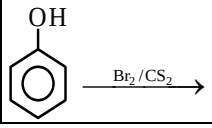
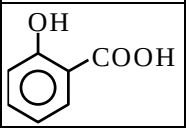
14. Match the column

	Column-I (Reactions)		Column-II (Product)
(a)	$CO + 2H_2 \xrightarrow[573\text{-}673K]{ZnO\text{-}Cr_2O_3}$	(p)	$C_2H_5–O–C_2H_5$
(b)	$C_6H_{12}O_6 \xrightarrow{Zymase}$	(q)	$CH_3–OH$
(c)	$CH_3CH_2–OH \xrightarrow[443K]{Conc\,H_2SO_4}$	(r)	$C_2H_5OH+CO_2$
(d)	$CH_3CH_2–OH \xrightarrow[413K]{Conc\,H_2SO_4}$	(s)	$CH_2=CH_2$

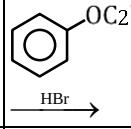
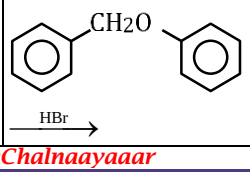
(1) a-q, b-r, c-p, d-r (2) a-q, b-r, c-s, d-p
(3) a-r, b-s, c-p, d-q (4) a-r, b-p, c-q, d-s

15. Match the column

	Column-I (Reaction)		**Column-II (Product)**
(a)		(P)	
(b)		(Q)	
(c)		(R)	
(d)		(S)	

(1) a-R, b-P, c-S, d-Q (2) a-P, b-S, c-R, d-Q
(3) a-P, b-Q, c-R, d-S (4) a-S, b-Q, c-P, d-R

16. Match the column-I and column-II

	Column-I (Reactions)		Column-II (Product)
(a)	$CH_3CH_2CH_2–O–CH_3 \xrightarrow{HBr}$	(p)	$(CH_3)_3C–Br + C_2H_5OH$
(b)		(q)	$PhCH_2–Br + PhOH$
(c)		(r)	$Ph–OH + C_2H_5Br$
(d)	$(CH_3)_3C–O–C_2H_5 \xrightarrow{HBr}$	(s)	$CH_3Br + CH_3CH_2CH_2OH$

(1) a-r, b-s, c-p, d-q (2) a-s, b-r, c-q, d-p
(3) a-s, b-q, c-r, d-p (4) a-q, b-p, c-r, d-s

17. Match the column

	Column-I (Compounds)		**Column-II (pKa values)**
(a)	C_2H_5OH	(p)	8.3
(b)	C_6H_5OH	(q)	10.2
(c)	$p–CH_3–C_6H_4–OH$	(r)	15.9
(d)	$m–NO_2–C_6H_4–OH$	(s)	10.0

Correct option is-
(1) a-r, b-s, c-p, d-q (2) a-r, b-s, c-q, d-p
(3) a-s, b-r, c-p, d-q (4) a-s, b-p, c-q, d-r

18. Match the column

	Column-I (Compounds)		**Column-II (Boiling point)**
(a)	Ethanol	(p)	309.1 K
(b)	Methoxy methane	(q)	231 K
(c)	Propane	(r)	351 K
(d)	n-pentane	(s)	248 K

(1) a-p, b-q, c-r, d-s (2) a-r, b-s, c-p, d-q
(3) a-r, b-s, c-q, d-p (4) a-s, b-r, c-q, d-p

19. Given below are two statements:

Statement-I : The reaction of alcohol with carboxylic acid is carried out in presence of small amount of concentrated sulphuric acid. This reaction is reversible and therefore, water is removed as soon as it formed.

Statement-II : Reaction of alcohol with acid chloride is carried in presence of base (pyridine) which do not neutralize HCl which is formed during the reaction.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both statement I and statement II are incorrect.
(2) Statement I is incorrect but statement II is correct.
(3) Statement I is correct but statement II is incorrect
(4) Both statements I and statements II are correct.

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20. Given below are two statements:
Statement-I : The ortho and meta isomers of nitrophenol can be separated by steam distillation.
Statement-II : o-nitrophenol is steam volatile due to intra molecular hydrogen bonding while m-nitrophenol is less volatile due to inter molecular hydrogen bonding which causes the association of molecules.
In the light of the above statements, choose the most appropriate answer from the options given below:
(1) Both statement I and statement II are incorrect.
(2) Statement I is incorrect but statement II is correct.
(3) Statement I is correct but statement II is incorrect
(4) Both statements I and statements II are correct.

21. Given below are two statements:
Statement-I : In ether formation by Williamson synthesis, if a primary alkyl halide is used, an alkene is the only reaction product and no ether is formed.
Statement-II : Alkoxides are not only nucleophiles but strong bases as well. They react with alkyl halides leading elimination reactions as well as substitution reactions.
In the light of the above statements, choose the most appropriate answer from the options given below:
(1) Both statement I and statement II are incorrect.
(2) Statement I is incorrect but statement II is correct.
(3) Statement I is correct but statement II is incorrect
(4) Both statements I and statements II are correct.

22. Given below are two statements:
Statement-I : Both ethoxy ethane and butan-1-ol are miscible to almost same extent i.e. 7.5 and 9g per 100 mL water respectively while pentane is essentially immiscible with water.
Statement-II : This is due to the fact that just like alcohols, oxygen of ether can also form hydrogen bonds with water.
In the light of the above statements, choose the most appropriate answer from the options given below:
(1) Both statement I and statement II are incorrect.
(2) Statement I is incorrect but statement II is correct.
(3) Statement I is correct but statement II is incorrect
(4) Both statements I and statements II are correct.

23. Given below are two statements:
Statement-I : Alcohols are weaker acids than water. This can be illustrated by the reaction of water with an alkoxide.

$$\underset{\text{Base}}{R-O^{\ominus}} + \underset{\text{acid}}{H-O-H} \longrightarrow \underset{\text{Conjugate acid}}{R-OH} + \underset{\text{Conjugate base}}{\overset{\ominus}{O}H}$$

Statement-II : Alcohols acts as bronsted bases. it is due to the presence of unshared electron pairs on oxygen, which makes them proton acceptors.
In the light of the above statements, choose the most appropriate answer from the options given below:
(1) Both statement I and statement II are incorrect.
(2) Statement I is incorrect but statement II is correct.
(3) Statement I is correct but statement II is incorrect
(4) Both statements I and statements II are correct.

24. Given below are two statements:
Statement-I : Phenol reacts with carbon dioxide directly by electrophilic aromatic substitution and gives ortho hydroxybenzoic acid as main reaction product.
Statement-II : Phenoxide ion generated by treating phenol with sodium hydroxide is even more reactive than phenol towards electrophilic aromatic substitution.
In the light of the above statements, choose the most appropriate answer from the options given below:
(1) Both statement I and statement II are incorrect.
(2) Statement I is incorrect but statement II is correct.
(3) Statement I is correct but statement II is incorrect
(4) Both statements I and statements II are correct.

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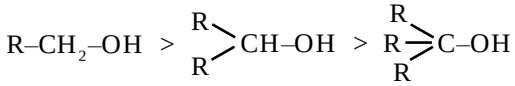
25. Given below are two statements:

Statement-I : The acid strength of alcohols decreases in the following order.



Statement-II : The acidic character of alcohols is due to the polar nature of O–H bond. An electron donating group increases electron density on oxygen tending to decrease the polarity of –O–H bond.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both statement I and statement II are incorrect.

(2) Statement I is incorrect but statement II is correct.

(3) Statement I is correct but statement II is incorrect

(4) Both statements I and statements II are correct.

26. Given below are two statements:

Statement-I : Alcohols are soluble in Lucas reagent (conc HCl and $ZnCl_2$) while their halides are immiscible and produce turbidity in solution.

Statement-II : In case of tertiary alcohols, turbidity is produced immediately as they form halides easily. Primary alcohols do not produce turbidity at room temperature.

In the light of the above statements, choose the most appropriate answer from the options given below:

(1) Both statement I and statement II are incorrect.

(2) Statement I is incorrect but statement II is correct.

(3) Statement I is correct but statement II is incorrect

(4) Both statements I and statements II are correct.

27. Which of the following gives 2°-alcohol ?

(A) $CH_3CH=CH_2 \xrightarrow[(ii)H_2O_2/\overset{\ominus}{O}H]{(i)BH_3/THF}$

(B) $CH_3CH=CH_2 \xrightarrow[(ii)NaBH_4/\overset{\ominus}{O}H]{(i)(CH_3COO)_2Hg/H_2O}$

(C) $CH_3CH=CH_2 \xrightarrow{Conc.H_2SO_4}$

(D) $CH_3-CH=CH_2 \xrightarrow{dil\ H_2SO_4}$

(1) A, B and C are correct

(2) A and B are correct

(3) A and C are correct

(4) B and D are correct

28. Diethyl ether can not be obtained by the reaction of ethyl bromide with

(A) Ethanol (B) Sodium ethoxide

(C) Moist silver oxide (D) Dry silver oxide

(1) B, D only (2) A, C only

(3) A, B, D only (4) A, D only

29. Which of the following statement is/are correct ?

(A) Phenol is less acidic than ethanol

(B) Phenol is less acidic than acetic acid

(C) Phenol is more acidic than acetic acid

(D) Acetic acid is more acidic than ethanol

(1) A, B and C are correct

(2) A, B are correct

(3) B and D are correct

(4) A and C are correct

30. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)**.

Assertion(A) : t-butyl methyl ether is prepared by reaction of t-butyl bromide with methoxide ion.

Reason(R) : This reaction follows S_N2 mechanism.

In the light of the above statements, choose the **most appropriate** answer from the options given below :

(1) Both (A) and (R) are correct and (R) is the correct explanation of (A).

(2) Both (A) and (R) are correct but (R) is not the correct explanation of (A).

(3) (A) is correct but (R) is not correct.

(4) (A) and (R) both are incorrect.

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31. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)**.
Assertion(A) : Anisole on reaction with HI gives phenol and methyl iodide.
Reason(R) : Phenyl-oxygen bond is stronger than methyl-oxygen bond in anisole and hence is not cleaved by HI.
In the light of the above statements, choose the **most appropriate** answer from the options given below :
(1) Both (A) and (R) are correct and (R) is the correct explanation of (A).
(2) Both (A) and (R) are correct but (R) is not the correct explanation of (A).
(3) (A) is correct but (R) is not correct.
(4) (A) is not correct but (R) is correct.

32. Given below are two statements; one is labelled as **Assertion (A)** and the other is labelled as **Reason(R)**.
Assertion(A) : In lucas test 3° alcohols react immediately.
Reason(R) : An equimolar mixture of anhydrous $ZnCl_2$ and conc. HCl is called lucas reagent.
In the light of the above statements, choose the **most appropriate** answer from the options given below :
(1) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A).**
(2) **(A)** is correct but **(R)** is not correct.
(3) **(A)** is not correct but **(R)** is correct.
(4) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of **(A).**

33. **Assertion (A) :** Addition of methyl alcohol to phenyl magnesium bromide gives Benzene.
Reason (R) : Methyl alcohol is a stronger acid than Benzene.
(1) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A).**
(2) **(A)** is correct but **(R)** is not correct.
(3) **(A)** is not correct but **(R)** is correct.
(4) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of the **(A).**

34. **Assertion (A) :** Phenoxide ion is more stable and favours the ionisation of phenol.
Reason (R) : There is charge delocalisation in phenol, and resonance structure have charge separation.
In the light of the above statements, choose the **most appropriate** answer from the options given below :
(1) Both **(A)** and **(R)** are correct but **(R)** is not the correct explanation of **(A).**
(2) **(A)** is correct but **(R)** is not correct.
(3) **(A)** is not correct but **(R)** is correct.
(4) Both **(A)** and **(R)** are correct and **(R)** is the correct explanation of the **(A).**

EXERCISE-III (Analytical Questions) ANSWER KEY

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Answer	3	3	3	3	2	2	3	3	3	3	4	1	2	2	1
Question	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Answer	2	2	3	3	1	2	4	4	2	3	4	4	2	3	4
Question	31	32	33	34											
Answer	1	1	4	4											

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